FACT SHEET

NASA Water Process Analyzer Serves the Commercial World

A Wisconsin company is successfully commercializing water analyzers originally designed under a Small Business Innovation Research (SBIR) contract sponsored by NASA at Kennedy Space Center.

Applied Spectrometry Associates (ASA), Inc. of Waukesha has installed over 100 ChemScan® systems at industrial and municipal facilities, including multiple parameter systems at major cities like Austin, Texas; Calgary and Edmonton, Alberta, Canada; Gainesville, Orlando and Tampa, Florida; Las Vegas, Nevada; Los Angeles; New York City, Phoenix, Arizona; and Seoul, South Korea.

ASA president Bernie Beemster said his company is offering four models of its ChemScan® Process Analyzers. ASA bought the manufacturing rights from Biotronics Technologies, Inc., also of Waukesha, who originally worked with the KSC Biomedical Office under the SBIR contract to develop the analyzer.   NASA needed the innovation for monitoring hydroponic plant nutrients in the Bioregenerative Life Support System (BLSS) program.

Commercially, ChemScan Process Analyzers are used to measure multiple chemicals at municipal drinking water treatment plants and municipal wastewater treatment plants or in industrial water chemistry processes. Beemster explained that large flow volumes, a dynamic chemical matrix, and a substantial motive to obtain real-time chemical analysis information characterize typical applications for process analyzers. In 1998 ASA added a new model to its product line, the ChemScan UV-2150 Process Analyzer, offering improved reliability and reduced operation and maintenance cost for automatic analysis of ammonia or phosphate in water.

The KSC Biomedical Office desired a water chemistry analyzer to provide on-line, real-time monitoring of plant nutrients in hydroponic solutions and the biomass processing reactors of CELSS. Dr. John Sager, the NASA technical representative, said the instrument was to be capable of detecting, identifying, and quantifying the macronutrients (P, K, Ca and Mg) absorption spectra. NASA's Advanced Life Support (ALS) program has been working on bioregenerative life support for future long-duration space flights and permanent bases in space. Sager explained that when humans establish permanent bases on the lunar surface or travel to Mars for exploration, they would need food, water and air. For long-term missions it will not be economically feasible to resupply these life support elements from Earth. Humans will need to develop systems to produce food, purify their water supply, and create oxygen from the carbon dioxide they expel based on plant production systems.

The ChemScan analyzers can be applied to various municipal water and industrial processing plants, saving money due to low maintenance times and on-line monitoring, either in-plant or remote locations. ChemScan analyzers require only a few hours each month for maintenance, including the time required for preparation of reagents. Very little time is required for calibration verification or adjustment, and no time is required for recalibration. Beemster pointed out that customers who have used ChemScan report that the analyzer requires less maintenance than any other chemical analyzer in their facility. Reliability is the most important attribute for a process analyzer, particularly if the output from the analyzer is going to be used as data for operation or adjustment of a treatment process.

ChemScan can detect any chemical substance that absorbs light in the ultraviolet or visible wavelength range. Ions of nutrients, ions of heavy metals that form coordination compounds in water, unsaturated (double bonded or triple bonded) hydrocarbons and aromatics are usually good candidates for analysis using ultraviolet or visible spectrometry. Chemicals that possess natural absorbance characteristics can be detected directly using primary absorbance techniques.

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